

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/28187

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01D 53/14  
US CL : 95/164,176,204,235,236; 96/234

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 95/164,176,204,235,236; 96/234

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
NONE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3,590,555 A (WACKERNAGEL) 06 July 1971, Fig. 2, col. 1 line 65-col. 2 line 75.	1,2,6,8,9,12
X	US 3,594,985 A (AMEEN et al.) 27 July 1971, Fig. 1, col. 2 line 29-col. 4 line 75.	1,2,6,8,9,12
X	US 4,971,607 A (GAZZI et al.) 20 November 1990, Figs.1-2, col. 5 line 60-col. 7 line 35.	1-3,,6,8-9,11,12
X	US 6,203,599 B1 (SCHUBERT et al.) 20 March 2001, Fig.1, col. 2 line 65-col. 4 line 45.	1,2,6,8,9,12
A	US 4,050,909 A (RANKE) 27 September 1977.	1-20
A	US 4,533,373 A (BUTZ et al.) 06 August 1985.	1-20
A	US 4,797,140 A (LANDECK et al.) 10 January 1989.	1-20

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

02 December 2003 (02.12.2003)

Date of mailing of the international search report

31 DEC 2003

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Duane S. Smith

Telephone No. 703-308-0651